

1175PCT

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

10/009080

INTERNATIONAL APPLICATION NO.  
PCT/US00/14185INTERNATIONAL FILING DATE  
23 MAY 2000PRIORITY DATE CLAIMED  
04 JUNE 1999

TITLE OF INVENTION: WET CUP THROAT SEAL AND BEARING ASSEMBLY

APPLICANT(S) FOR DO/EO/US: WEINGERBER ET AL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☐ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
- a. ☐ is attached hereto (required only if not communicated by the International Bureau)
- b. ☒ has been communicated by the International Bureau.
- c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).
- a. ☐ is attached hereto.
- b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)).
- a. ☐ are attached hereto (required only if not communicated by the International Bureau).
- b. ☐ have been communicated by the International Bureau.
- c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
- d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11 to 20 below concern document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 – 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

DEC 2001

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21. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (27 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO..... **\$1000.00**

International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO..... **\$860.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... **\$710.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
but all claims did not satisfy provisions of PCT Article 33 (1)-(4)..... **\$690.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO  
and all claims satisfied provisions of PCT Article 33 (1)-(4)..... **\$100.00**

**ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

\$100.00

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

**CLAIMS****NUMBER FILED****NUMBER EXTRA****RATE**

\$

Total Claims

-20 =

x \$18.00

\$

Independent Claims

- 3 =

x \$80.00

\$

MULTIPLE DEPENDENT CLAIM(S) (if applicable)

+ \$270.00

\$

**TOTAL OF ABOVE CALCULATIONS =**

\$

☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above  
should be reduced by 1/2.

\$

**SUBTOTAL =**

\$100.00

Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$100.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00** per property +

\$

**TOTAL FEES ENCLOSED =**

\$100.00

Amount to be  
refunded:

\$

charged:

\$

- a. ☐ A check in the amount of \$ \_\_\_\_\_ to cover the above fees is enclosed.
- b. ☒ Please charge my Deposit account No. 07-1775 in the amount of \$ 100.00 to cover the above fees.  
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
overpayment to Deposit Account No. 07-1775. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card**  
information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR  
1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SIGNATURE

Douglas B. Farrow  
NAME

28582

REGISTRATION NUMBER

**WET CUP THROAT SEAL AND BEARING ASSEMBLY****TECHNICAL FIELD**

A wet cup throat seal and bearing combination is designed for use in a  
5 reciprocating piston pump where in the wet cup is designed to hold the seal assembly.

**BACKGROUND ART**

Wet cups and throat seals are well known for use in reciprocating piston pumps.  
While prior art devices have been generally satisfactory, it is always desirable to increase  
10 ease of manufacture, seal life and ease of servicing while decreasing cost.

**DISCLOSURE OF THE INVENTION**

A wet cup is machined from hexagonal stainless steel bar stock. A bearing is a cut  
shoulder bearing which is machined from acetal bar. The throat seal is a standard U-cup  
15 seal. The wet cup and the bearing are assembled into an outlet housing. The bearing  
guides the displacement rod and the seal prevents leakage as the displacement rod  
reciprocates.

The wet cup and cylinder are sized so that the piston seals and throat seals are  
interchangeable. The shoulder on the bearing insures that the bearing will remain coaxial

with the wet cup and the pump. The combination can be serviced by unscrewing the wet cup from the outlet housing while the bearing and throat seal can be removed from the wet cup without tools.

These and other objects and advantages of the invention will appear more fully from the following description made in conjunction with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views.

#### **BRIEF DESCRIPTION OF DRAWINGS**

Figure 1 is an exploded view of a pump utilizing the inventive wet cup bearing and seal assembly.

Figure 2 is an exploded view of the inventive wet cup bearing and seal assembly.

Figure 3 is a cross-sectional view of the inventive wet cup bearing and seal assembly.

#### **BEST MODE FOR CARRYING OUT THE INVENTION**

Wet cup 1 is machined from hexagonal stainless steel bar stock. Bearing 2 is a cut shoulder bearing which is machined from acetal bar. Throat seal 3 is a standard U-cup seal. The combination is assembled as shown in FIGS 1, 2, and 3. Wet cup 1 is assembled

into an outlet housing 4 and the bearing 2 to an outlet housing 4. The bearing 2 guides the displacement rod 5 and seal 3 prevents leakage as the displacement rod reciprocates.

Wet cup 1 and cylinder 7 are sized so that piston seals 6 and throat seals 3 are interchangeable. Such a combination insures long seal life in acid catalyzed lacquers without requiring adjustments to the seals. The shoulder on the bearing insures that the bearing will remain coaxial with the wet cup and the pump. The combination can be serviced by unscrewing the wet cup 1 from the outlet housing 4 while the bearing 2 and throat seal 3 can be removed from the wet cup without tools. There is no requirement to disassemble the remainder of the displacement pump.

In the event of throat seal failure and there are no spare seals on hand, a use could switch the downward facing piston seal and the throat seal and continue operating the pump.

It is contemplated that various changes and modifications may be made to the assembly without departing from the spirit and scope of the invention as defined by the following claims.

**CLAIMS**

1. A wet cup throat seal and bearing assembly for use on a reciprocating piston pump having a housing and a displacement rod which reciprocates along an axis, said assembly comprising:

5 a wet cup threadedly engaged in said housing;

an plastic bearing having a shoulder and a cut parallel to said axis; and

a throat seal, wherein said bearing and said throat seal are disposed around said displacement rod and retained between said housing and said wet cup.

10 2. The wet cup throat seal and bearing assembly of claim 1 wherein said throat seal is a U-cup seal.

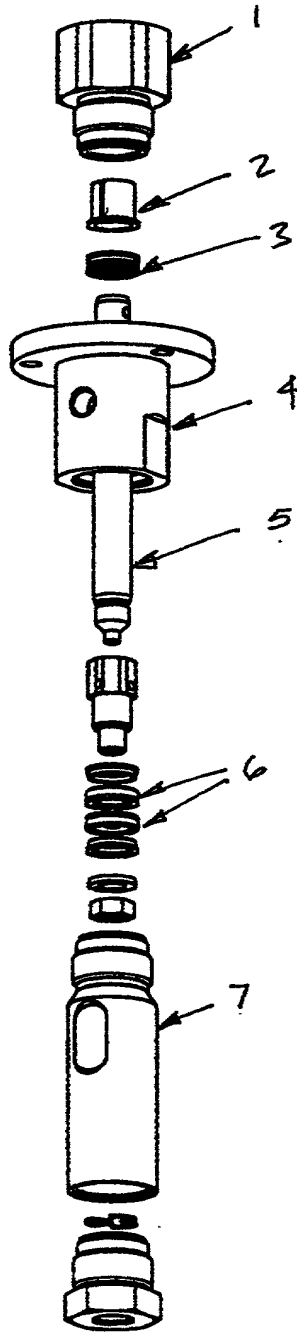
3. The wet cup throat seal and bearing assembly of claim 1 wherein said bearing is formed from acetal.

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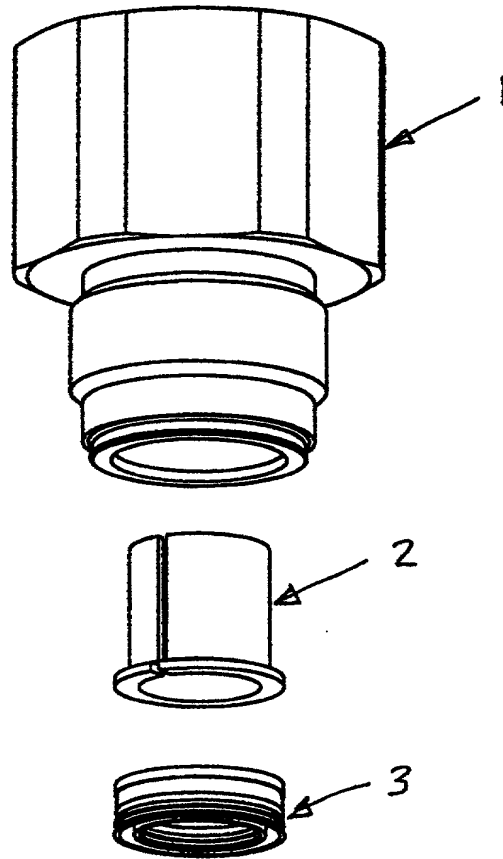


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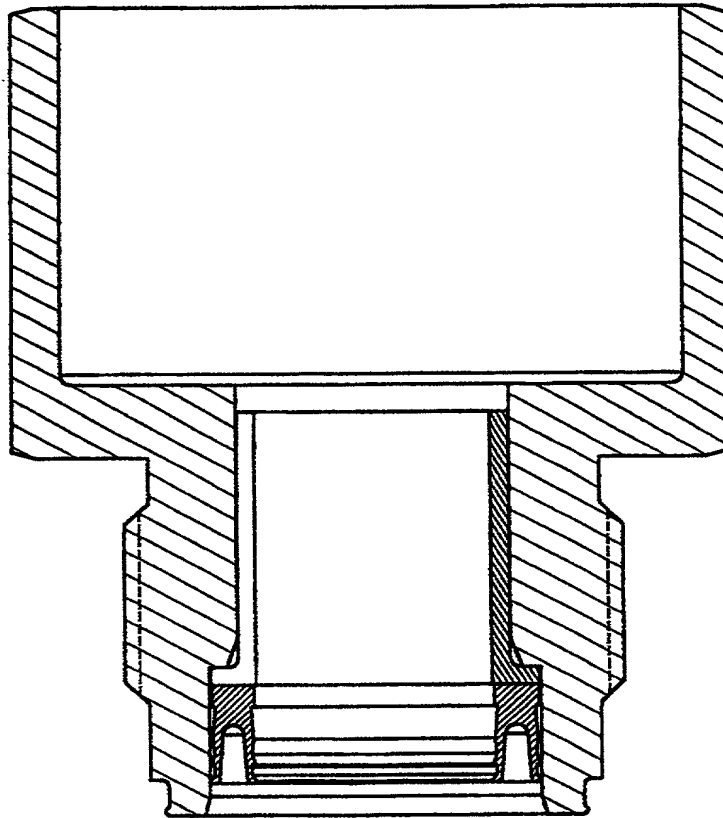


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<b>DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)</b>	<b>Attorney Docket Number</b>		1175 PCT	
	<b>First Named Inventor</b>		Weinberger	
	<b>COMPLETE IF KNOWN</b>			
	<b>Application Number</b>	/		
	<b>Filing Date</b>			
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	OR	<input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	<b>Group Art Unit</b>	
			<b>Examiner Name</b>	

**As a below named inventor, I hereby declare that:**

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

WET CUP THROAT SEAL AND BEARING ASSEMBLY

*(Title of the Invention)*

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 23 May 2000 as United States Application Number or PCT International

Application Number PCT/US00/14185 and was amended on (MM/DD/YYYY)  (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of an PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional Foreign Application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

**DECLARATION – Utility or Design Patent Application**

Direct all correspondence to:

Customer Number  
or Bar Code Label

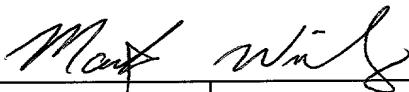
or

☒

Correspondence address below

Name Douglas B. Farrow, Corporate Intellectual Property Counsel, Graco Inc.Address P.O. Box 1441City MinneapolisState MNZIP 55440-1441Country USTelephone 612-623-6769Fax 612-623-6944

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**NAME OF SOLE OR FIRST INVENTOR:**☐ A petition has been filed for this unsigned inventorGiven Name  
(first and middle [if any])Mark T.Family Name  
or SurnameWeinbergerInventor's  
SignatureDate 11-29-01Residence: City Mounds ViewState MNMNCountry U.S.A.Citizenship U.S.A.Mailing Address 8011 Eastwood RoadCity Mounds ViewState MNZIP 55112Country USA**NAME OF SECOND INVENTOR:**☐ A petition has been filed for this unsigned inventorGiven Name  
(first and middle [if any])James P.Family Name  
or SurnameKorzenowskiInventor's  
SignatureDate 11/29/01Residence: City MinneapolisState MNMNCountry U.S.A.Citizenship U.S.A.Mailing Address 715 Main Street NECity MinneapolisState MNZIP 55413Country USA☒ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.